Name:

at1124exam: Radicals and Squares (v823)

Question 1

Simplify the radical expressions.

$\sqrt{63}$ $\sqrt{28}$ $\sqrt{20}$

$\sqrt{3 \cdot 3 \cdot 7}$ $\sqrt{2 \cdot 2 \cdot 7}$ $\sqrt{2 \cdot 2 \cdot 5}$

$3\sqrt{7}$ $2\sqrt{7}$ $2\sqrt{5}$

Question 2

Find all solutions to the equation below:

$$2(x+5)^2 + 8 \;=\; 40$$

First, subtract 8 from both sides.

$$2(x+5)^2 = 32$$

Then, divide both sides by 2.

$$(x+5)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 5 = \pm 4$$

Subtract 5 from both sides.

$$x = -5 \pm 4$$

So the two solutions are $x = -1$ and $x = -9$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 10x = -16$$

$$x^2 + 10x + 25 = -16 + 25$$
$$x^2 + 10x + 25 = 9$$
$$(x+5)^2 = 9$$
$$x + 5 = \pm 3$$
$$x = -5 \pm 3$$
$$x = -2 \quad \text{or} \quad x = -8$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 5x^2 - 40x + 77$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 5 .

$$y = 5(x^2 - 8x) + 77$$

We want a perfect square. Halve -8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 5(x^2 - 8x + 16 - 16) + 77$$

Factor the perfect-square trinomial.

$$y = 5((x-4)^2 - 16) + 77$$

Distribute the 5.

$$y = 5(x-4)^2 - 80 + 77$$

Combine the constants to get **vertex form**:

$$y = 5(x-4)^2 - 3$$

The vertex is at point $(4, -3)$.